

**REMARKS**

The Office Action rejected claims 11-22, 28-37 and 39 under 35 U.S.C. § 112, first paragraph as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The Office Action stated that the specification lacks sufficient description to enable one to obtain polymers (block) under process conditions and with the various components represented by (i), (ii) and (iii).

The foregoing rejection is traversed in view of the following remarks:

The written description requirement under 35 U.S.C. § 112, first paragraph, provides:

“The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention (emphasis added).

The **standard** for determining whether the specification meets the enablement requirement was cast in the Supreme Court decision *Mineral Separation v. Hyde*, 242 U.S. 261, 270 (1916), which addressed the question: Is the experimentation needed to practice the invention **undue or unreasonable**? That standard is still the one to be applied. *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). Accordingly, even though the statute does not use the term "undue experimentation," it has been interpreted to require that the claimed invention be enabled so that any person skilled in the art can make and use the invention without undue experimentation. *In re Wands*, 858 F.2d at 737, 8 USPQ2d at 1404 (Fed. Cir. 1988). See also *United States v. Telectronics, Inc.*, 857 F.2d 778, 785, 8 USPQ2d 1217, 1223 (Fed. Cir. 1988) ("The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation."). A patent need not teach, and preferably omits, what is well known in the art. *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991); *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), *cert.*

*denied*, 480 U.S. 947 (1987); and *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1463, 221 USPQ 481, 489 (Fed. Cir. 1984). Determining enablement is a question of law based on underlying factual findings. *In re Vaeck*, 947 F.2d 488, 495, 20 USPQ2d 1438, 1444 (Fed. Cir. 1991); *Atlas Powder Co. v. E.I. du Pont de Nemours & Co.*, 750 F.2d 1569, 1576, 224 USPQ 409, 413 (Fed. Cir. 1984). See also M.P.E.P § 2164.01.

M.P.E.P § 2164.01(a) lists the so called *Forman* factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue." *Ex Parte Forman*, 230 USPQ 546, 547 (Bd. Pat. App. & Int. 1986, cited with approval in *In re Wands*, 8 USPQ2n 1400, 1404 (Fed. Cir. 1988).

These *Forman* factors include, but are not limited to:

- (A) The breadth of the claims;
- (B) The nature of the invention;
- (C) The state of the prior art;
- (D) The level of one of ordinary skill;
- (E) The level of predictability in the art;
- (F) The amount of direction provided by the inventor;
- (G) The existence of working examples; and
- (H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure.

When viewed under the foregoing *Forman* factors, one can readily ascertain from the various mechanisms exhaustively described on pages 8-24 of the specification that the block polymers of the present invention can be made without any undue experimentation.

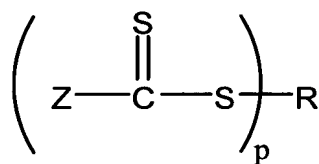
The Office Action stated that process for forming block polymers using (ii) with various heterocyclic components, such as dithioazines (sic), triazines, benzodiazines; unsaturated carboncyclics, such as normoromenes (sic); alkenyls, such as dodecenyls, are not shown to be to be operable in obtaining block polymers as disclosed. The foregoing remark is respectfully traversed in view of the following comments:

The specification at page 8, lines 25-31 and page 5, lines 1-4 states that:

"While not wishing to be limited to any particular mechanism, it is believed that the mechanism of the process is as summarized in Scheme 1 below. Propagating radicals  $P_n^\bullet$  are produced by radical polymerization. These can react reversibly with

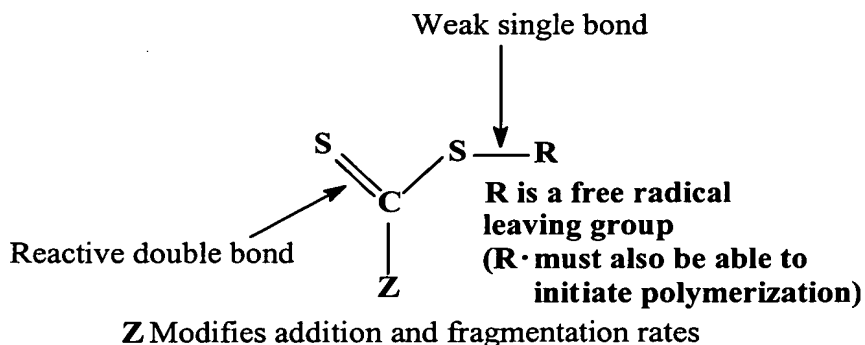
the chain transfer agent RA to form an intermediate radical  $P_nA(\bullet)R$  which fragments to give a radical  $R\bullet$  (which adds monomer to reinitiate polymerization) and a new transfer agent  $P_nA$ . This new transfer agent  $P_nA$  has similar characteristics to the original transfer agent RA in that it reacts with another propagating radical  $P_m\bullet$  to form an intermediate radical  $P_nA(\bullet)P_m$  which fragments to regenerate  $P_n\bullet$  and form a new transfer agent  $P_mA$  which has similar characteristics to RA. This process provides a mechanism for chain equilibration and accounts for the polymerization having living characteristics."

Claim 11 recites (ii) component as a chain transfer agent:

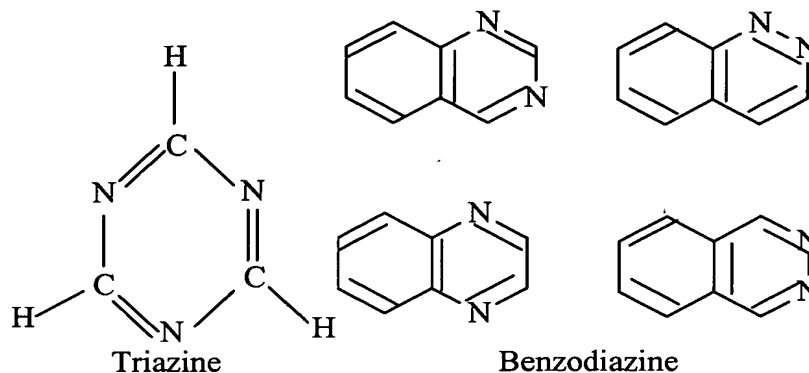


wherein R is selected from the group consisting of optionally substituted alkyl; optionally substituted alkenyl; optionally substituted alkynyl; an optionally substituted saturated, unsaturated or aromatic carbocyclic or heterocyclic ring; and a polymer chain prepared by any polymerization mechanism; in agent C,  **$R\bullet$  is a free-radical leaving group that initiates free radical polymerisation** (emphasis added). Thus, any component that includes an R group **not capable of generating free-radical leaving group** would be automatically excluded from being considered to be a chain transfer agent suitable for producing a block polymer of the present invention. Thus, it is not seen why the recited description of the component (ii) is not sufficiently enabling to one of ordinary skill in the art without undue experimentation.

Additionally, one can further discern the role of various elements of the chain transfer agent, having  $p = 1$ , in the present invention with the following diagram:



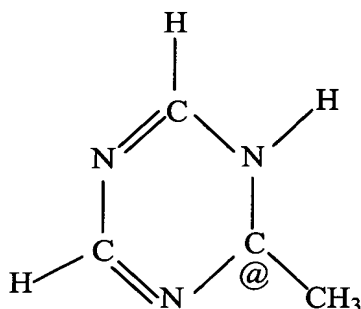
With respect to the specific components listed in the Office Action to the extent understood, it would readily clear to one of ordinary skill in the art that triazines and benzodiazines having the following formulas will not provide useable radical leaving groups:



Both of the aforescribed compounds have aromatic ring structures. The ring bonds in aromatic structures are particularly strong because the de-localization of ring atom electrons provides additional stabilization energy. These stable bonds cannot easily be severed to form the radical. Therefore, the only other alternative would be to form a radical by severing the C-H bond. However, the C-H bond length in aromatic compounds is 1.084 Angstroms while the normal C-H bond length in monosubstituted alkyl is 1.101 Angstroms (Handbook of Chemistry and Physics, The Chemical Rubber Co., 45<sup>th</sup> Edition). This shorter bond length indicates that the C-H bond in the aromatic compound is more strongly held and is less likely to form the radical. In addition, if the radical were to be formed it would be positioned on the ring. In such a position it does not have the benefit of stabilization from ring bonds, since it is not allylic to those bonds, and does not benefit from any other radical stabilization groups.

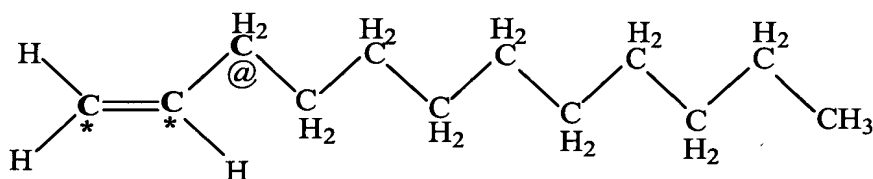
Therefore, as it is a **requirement** that (R) group must be a **free radical leaving** group in the present claims, it is not seen why one of ordinary skill in the art would select the heterocyclics listed in the Office Action, which do not provide **free radical leaving** groups. It is well known, as discussed above, that the heterocyclics listed in the Office Action do not provide **free radical leaving** groups. It should also be noted that the species of heterocyclics listed on page 15, lines 3-9 do not include any of the heterocyclics **listed in the Office Action**.

However, if the triazine were to be replaced by the following heterocyclic, there would be no problem in forming a useable free radical leaving group, as (-S-) group in component (ii) can be attached to the allylic carbon (marked by @).



The Office Action stated that alkenyls, dodecenyls will not be shown to be operable in obtaining block polymers as disclosed. The foregoing remark is respectfully traversed in the view of the following comments.

The dodecenyl results from dodecene, shown below. It would be clear to one of ordinary skill in the art that allylic carbon (marked with @) will give rise to a free radical leaving group as opposed to vinylic carbons (marked with \*). The reactivity of an allylic carbon is well known and one ordinary skill in the art would attach (-S-) group of the component (ii) to allylic carbon and not to vinylic carbons, which obviously would not give rise to a free radical leaving group.



1-Dodecene

The Office Action stated that when Z is O, block resin would not be obtained. The foregoing comment is respectfully traversed since "Z" group in the chain transfer agent in claim 11 **cannot** be "O". It **can** include a substituted or unsubstituted **alkoxy** but not "O".

The Office Action stated that adjacent descriptions in claim 12 needs to be clarified. In order to overcome the rejection claims 11 and 12 were amended to recite genus and delete species.

The Office Action stated that its not clear how the substituents R" for U would generate a class of monomers for polymerization, for example, assuming that OR" is Oaryl and R" is heterocyclic (of unknown makeup), etc., an improper compound


would apparently be represented. The foregoing comment is respectfully traversed in view of the following comments:

From the recitation of claim 11 it can be seen that the group "U" can be one selected from the group consisting of hydrogen, halogen, and **optionally substituted C<sub>1</sub>-C<sub>4</sub> alkyl** wherein the substituents are independently selected from the group that consists of hydroxy, OR" . . . "; and V can be selected from the group consisting of hydrogen, R" and halogen. Thus, U can be C<sub>1</sub>-C<sub>4</sub> alkyl substituted with OR", such as, for example, CH<sub>2</sub>OR" and V can be R". **But "U" cannot be OR" as contended in the Office Action. Thus, the proposed construct in the Office Action is not possible as claimed.**

Additionally, claim 17 was amended to include the missing verb "is" after "R".

Should the Examiner wish to discuss any issues involved in this application, the Examiner is respectfully invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

  
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